The very dry air peculiar to the west side of Ross Sea, and which makes itself felt as a characteristic peculiarity of the climate, may then perhaps be explained as the result of this district lying in the lee of Victoria Land and of East Antarctica in general. The westerly currents of the polar whirl, deprived of their moisture by the heights of East Antarctica, attain this district in a desiccated condition which still characterizes them when they leave the south polar regions. The stormy southwest winds of Snow Hill are also extraordinarily dry, yet of such a low temperature as is only to be explained if they descend from some great reservoir of cold, viz, the high-lying central portions of Antarctica.

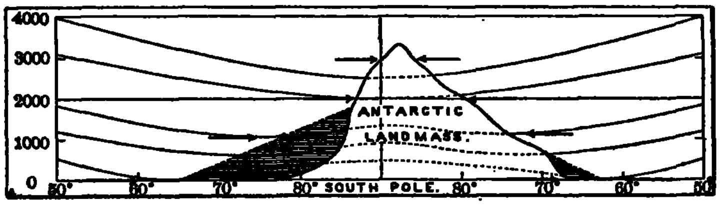

FIG. 5.—Diagrammatic cross section of the south polar regions, to show the position of the isobaric surfaces and the direction of the winds. Arrows show the meridional components of the wind; shaded areas show the region of prevailing easterlies Altitudes in meters.

This concept that the fixed land masses of the south polar regions are of considerable altitude, that they extend up into a suprapolar cyclonic whirl, thus solves in a general way the difficulty of accounting for the ice-covered condition of central Antarctica. It must be the task of future expeditions to secure the detailed foundations for the hypothesis and particularly to reveal the secrets of the upper air over the nucleus of the south polar continent. Far-reaching conclusions will be founded upon this exploration, for in this way it will become possible to secure more intimate knowledge of the processes which promoted the growth of the great inland ice sheets over Canada and Scandinavia in the glacial period. These ancient ice sheets also reached considerable altitudes, and presumably rose above the zone of anticyclonic circulation. It will be in this domain of comparative climatology that future antarctic explorations will yield the most valuable results.

The observation and recording of the marginal movements of the inland ice of Antarctica will be of great importance in judging secular variations in climate. These movements and the magnitude of the ice discharge furnish a very sensitive scale for measuring the secular changes in distribution of precipitation. The great extent of the ice-covered area here smooths out both local differences and transitory anomalies in weather. Only the great and enduring climatic changes, whether periodic or nonperiodic in character, can find any expression in the thickness and velocity of the inland ice. One of the most imperative needs in future antarctic exploration thus seems to be continuous observations of the movements of the inland ice at the largest possible number of stations along its margin.

C. G. S. UNITS IN THE ENGLISH DAILY WEATHER REPORT.

In the MONTHLY WEATHER REVIEW for February, 1914, page 100, Dr. W. N. Shaw mentioned that beginning with the issue for May 1, 1914, the Meteorological Office would extend the use of C. G. S. units of pressure to its Daily Weather Report.

The transition to the new unit is facilitated for the user of the British Daily Weather Report by a table on the first page, which presents the adopted equivalent reduced readings in inches of a mercurial barometer at latitude 45°. Further help is offered on the inside pages by a graphic scale comparing the reduced mercurial barometric readings in inches with the millibars used on the adjacent maps. On the daily charts themselves the isobars are drawn for intervals of 5 millibars, but they are numbered in centibars, and the old-style readings in inches are entered at one end of the line. At first it may cause a slight inconvenience to find the tabulated reports on pages 1 and 4 presenting the pressures in millibars and the 24-hour change in "half-millibars" while the charts use centibars; but no doubt the habitual readers of the Report will soon become familiar with this demonstration of the great convenience of a rational decimal system of notation.

In this connection it is interesting and encouraging to note that simultaneously with the change to Bjerknes's "millibar" comes the change to "millimeter" in the column headed Rainfall. It gives us grounds for hope that eventually the English-speaking races may also adopt a thermometric scale that will combine all the advantages of the Fahrenheit and the centigrade scales.

Recent discussions in the United States make it of special interest to remark here that the continuance of the Beaufort scale of wind force still seems justified in the present improved Daily Weather Report.

In the following paper the Weather Bureau presents its recently adopted standard tables for converting standard barometric readings into millibars.—[C. A., jr.]

551.5: 11.12

CONVERSION OF BAROMETRIC READINGS INTO STANDARD UNITS OF PRESSURE.

By ROY N. COVERT.

[Dated Instrument Division, Weather Bureau, May 8, 1914.]

Atmospheric pressures may be expressed in several different ways, viz, as heights in inches, or millimeters, of the barometric column of mercury or other suitable liquid; as pounds per square inch or grams per square centimeter of the weight of that column of mercury; or in absolute units of force.

Values expressed in one way are convertible into values expressed in each of the other ways. The conversion of atmospheric pressures, expressed in terms of the linear height of the mercurial column, into the form commonly used in engineering work, i. e., pressures expressed as a weight per unit area, requires a knowledge of the density of the mercury or liquid employed. The equation for this conversion is—

$$P = h\rho, \qquad (1)$$

where P=pressure expressed as a weight per unit area,
h=height of the column in linear units,
ρ=density of the liquid, i. e., the mass of a unit volume at a standard temperature.

The conversion of pressure when expressed in linear units of the height of the mercurial column into dynes per square centimeter or millibars requires values for both the density of mercury, ρ, and the acceleration of gravity, g. The equation which gives the pressure in millibars, P_{mb}, corresponding to the barometric height, h, is—

$$P_{mb} = h\frac{\rho g}{1000} \qquad (2)$$